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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/523,216

07/14/2005

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03/14/2008

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EXAMINER

SUCH, MATTHEW W

ART UNIT

PAPER NUMBER

2891

MAIL DATE

DELIVERY MODE

03/14/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/523,216

Applicant(s)

CLEMENS ET AL.

Examiner

MATTHEW W. SUCH

Art Unit

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-24 is/are pending in the application.
- 4a) Of the above claim(s) 2-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Election/Restrictions

1. Newly submitted subject matter of claims 2-16 is directed to an invention that lacks unity with the invention originally claimed subject matter in claims 17-24 for the following reasons. This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.
2. The inventions do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the common technique feature is a plurality of organic material layers and at least one through plating that is coupled to the plurality of organic material layers. This element cannot be a special technical feature under PCT Rule 13.2 because the element is shown in the prior art. Drury ('024) teaches a plurality of organic material layers (Elements 4 and 5) and at least one through plating that is coupled to the plurality of organic material layers (Fig. 4). The Applicant's specification also teaches that the structures are exclusive of one another having either a truncated conical through plating or a disruption element and a void (see Para. 0014-0016 and 0021, for example).
3. Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution

on the merits. Accordingly, claims 2-16 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Priority

4. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Objections

5. Claim 17 is objected to because of the following informalities: The phrases "which truncated conical through plating" in Line 7 and "of which layers" in Line 3 should read "the [said] at least one through plating having a truncated conical cross-sectional profile" and "the plurality of layers", respectively, in order to maintain proper antecedent basis for the elements throughout the claims. Appropriate correction is required.

6. Claim 19 is objected to because of the following informality: The phrase "through-plating" in Line 2 should read "through plating" in order to maintain consistent syntax throughout the claims. Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 18 and 23-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

a. Claims 18 and 23 each require an "ohmic" contact. The specification fails to disclose that the electrical contact is an "ohmic" contact (versus, for example, a Schottky contact), but only discloses that there is an electrical contact.

b. Claim 24 requires that the through plating can be "hollow". The specification fails to disclose that the through plating can be "hollow".

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 17-19 and 21-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claim 17 recites the limitation "the at least one central functional layer" in Line 8. There is insufficient antecedent basis for this limitation in the claim. Furthermore, the recitation renders the claim indefinite because it is unclear whether the at least one central functional layer is intended to be distinct from a central layer or if they are the same element and it is unclear as to whether there is more than one central layer.

b. Claim 18 recites the limitation "the at least two layers" in Line 2. There is insufficient antecedent basis for this limitation in the claim. Furthermore, the recitation renders the claim indefinite because it is unclear what comprises the at least two layers.

c. Claim 19 requires that "the plurality of layers are on the lower layer", which renders the claim indefinite because the lower layer is part of the plurality of layers, as required by claim 17. An object cannot be on itself. Furthermore, the phrase of "and form upper layers" renders the claim indefinite because it is unclear what forms upper layers.

d. Claim 21 recites the phrase "it" in Line 2, which renders the claim indefinite because it is unclear what recited element is intended to be "it". Claim 21 also recites "extends away from a lower layer to an upper layer", which is being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: the relationship between a lower

layer and an upper layer. It is unclear whether the component actually comprises an upper layer, or if an upper layer is merely a recitation that is not actually part of the claimed invention.

e. Claim 22 recites the phrase "it" in Line 3, which renders the claim indefinite because it is unclear what recited element is intended to be "it". Claim 22 recites the limitation "a plurality of layers" in Line 2, which renders the claim indefinite because it is unclear as to "a plurality of layers" is intended to be a distinct element from "a plurality of layers" as recited in claim 17 or if they are intended to be the same element. The claim recites "different than the lower layer", which renders the claim indefinite because it is unclear how "a plurality of layers" is different from "the lower layer". This is further unclear if the recitation of "a plurality of layers" is the same element as "a plurality of layers" recited in claim 17 since "a lower layer" is part of "a plurality of layers" recited in claim 17. An object cannot be different than itself.

f. Claim 23 recites the phrase "it" in Line 3, which renders the claim indefinite because it is unclear what recited element is intended to be "it". Claim 23 recites the limitation "a plurality of layers" in Line 2, which renders the claim indefinite because it is unclear as to "a plurality of layers" is intended to be a distinct element from "a plurality of layers" as recited in claim 17 or if they are intended to be the same element. The claim recites "different than the lower layer", which renders the claim indefinite because it is unclear how "a plurality of layers" is different from "the lower layer". This is further

unclear if the recitation of "a plurality of layers" is the same element as "a plurality of layers" recited in claim 17 since "a lower layer" is part of "a plurality of layers" recited in claim 17. An object cannot be different than itself. Claim 23 also recites the limitation "said layers" in Line 4. There is insufficient antecedent basis for this limitation in the claim. Furthermore, the recitation of "said layers" renders the claim indefinite because it is unclear which of all of the previously recited layers comprises "said layers".

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. In so far as the claims are definite, claims 17-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drury ('024) in view of Schmidt ('881).

Drury teaches an electronic component comprising a plurality of layers (Elements 3, 4, 5, 6, for example) that are organic functional layers (Col. 2, lines 17-23, at least). At least of the plurality of layers is a lower layer (such as Element 3 or 4, or Element 5 if viewed upsidedown, for example) and at least one of the other layers is a central layer (any of the Elements 3, 4, 5, 6 not already selected) and an upper layer (any additional of Elements 3, 4, 5, 6 not already selected). A least one through plating (Element 104) extends from a lower layer through at least the central layer and the through plating as a conical cross-sectional profile (see Figure 4, for

example). The through plating is electrically conductive (Col. 4, Line 63, for example) and is ohmically coupled to the at least two layers (Col. 3, Lines 28-39, for example). The through plating decreases in diameter from the lower layer to the upper layer (see Figure 4, when held upsidedown, for example). The through plating is hollow (see Figure 4, for example). While Drury explains that the shape of the intersection between the through contact and layers it contacts should be made large to decrease contact resistance (Col. 2, Lines 30-56, for example), there is no explicit disclosure that the conical cross-section of Drury is truncated.

Schmidt teaches truncated conical cross-sectional through platings (Elements 11, 11'; Figure 2g, for example). It would have been obvious to one of ordinary skill in the art at the time the invention was made to truncate the conical cross-section of Drury as taught by Schmidt in order to increase the surface area of the contact interface, thereby reducing contact resistance (see, for example, Schmidt Col. 4, Lines 28-31 and Drury Col. 2, Lines 30-56).

Response to Arguments

12. Applicant's arguments with respect to claims 2-24 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Okumura ('056) and Pennisi ('746) each teach truncated conical cross-section interconnects for semiconductor devices.

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW W. SUCH whose telephone number is (571) 272-8895. The examiner can normally be reached on Monday - Friday 9AM-5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bradley W. Baumeister can be reached on (571) 272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew W. Such
Examiner
Art Unit 2891

MWS
2/28/08

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